

OBSERVATIONS ON AFRICAN SCALE INSECTS (COCCIDÆ).

(No. 3.)

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The insects referred to in this paper were collected in various parts of Africa: those from Egypt by Mr. F. C. Willcocks, Entomologist to the Khedivial Agricultural Society, Cairo; those from Uganda by Mr. C. C. Gowdey, the Government Entomologist; and the remainder by Mr. S. A. Neave. The collections comprise several species which are known to be destructive to cultivated crops and fruits in various parts of the world; and others, judging by their numbers, must at least be considered of potential economic importance. Out of the total of 32 species, ten are new to science, and the lac-producing *Tachardia decorella*, Maskell, has not hitherto been recorded from Africa.

At present it is impossible for me to do more than describe the external characters of the newly discovered species: to notify the presence of others which may be found, from time to time, and to catalogue the names of the plants upon which they are known to occur. As there are few insects which are capable of causing greater damage to cultivated plants and fruits than scale-insects of various kinds, it is highly important that this portion of the work should be proceeded with as rapidly as possible, so that we may be in a position, in the near future, to present a comprehensive summary of the results.

It is important also from an economic standpoint, that the "scale" enemies of the indigenous plants should be investigated, as it has been frequently demonstrated that apparently unimportant species of COCCIDÆ have subsequently proved a serious menace to the cultivation of plants of various kinds in many parts of the world.

A study of the bionomics of these insects should prove of great interest and importance, but this must be left to entomologists who are resident in Africa.

***Aspidiotus trilobitiformis*, Green.**

On Oleander; Kilossa, Usagara, German East Africa, 27. XII. 1910 (*S. A. Neave*).

As is usual with this species, the females were all arranged along the mid-rib of the leaves of the food-plant. The puparia are less deltoid in shape than other examples which I have seen from Africa (Dar-es-Salaam); but the morphological characters agree so closely with Green's description* that there can, I feel, be no doubt as to its identity.

***Aspidiotus hederæ*, Vallot.**

"On a small tree," Uhehe district, German East Africa, about 4,000 ft., 1. XII. 1910 (*S. A. Neave*).

Mr. Neave adds the following particulars:—"though nearly every leaf on the west side of the tree was infested with this Coccid, the east side, *i.e.*, that

* Coccidæ of Ceylon, p. 41.

which was exposed to the prevailing wind, was almost free from it." Also on *Magnolia*, at Cairo,—May, 1908 (*F. C. Willcocks*); and on *Datura alba*, at Ghezireh, Cairo, 3. XI. 1910 (*F. C. Willcocks*).

Aspidiotus lataniae, Signoret (= *A. cydoniae*, Comstock).

On *Antigonon octopus*; Entebbe, Uganda, 22. IV. 1909 (*C. C. Gowdey*).

Diaspis (Aulacaspis) cinnamomi, var. *mangiferæ*, var. n. (fig. 1).

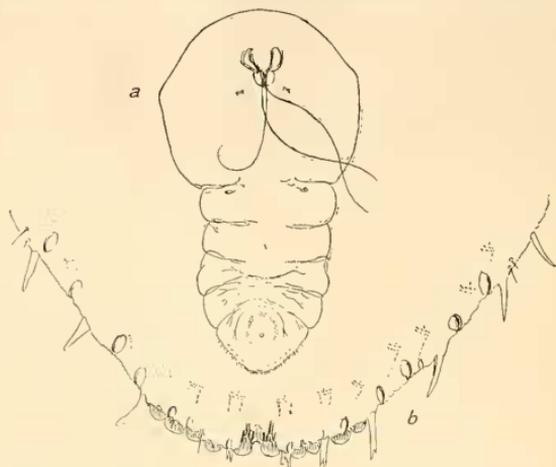


Fig. 1.—*Diaspis cinnamomi*, Newst. var. *mangiferæ*, Newst.; a, outline of female; b, margin of pygidium of adult female.

This variety differs from typical examples of *Diaspis cinnamomi*, Newst., in the following particulars:—The anterior lateral groups of circumgenital glands are much more numerous (26–29); the cephalothoracic area is considerably broader than the widest abdominal segment, and the median lobes are non-serrated. The puparia of the females are typical, and may be distinguished by the median black stripe in the larval pellicle.

On small mango trees imported from Ceylon; Gizeh, Egypt, 31. VIII. 1910 (*F. C. Willcocks*).

Diaspis regularis, sp. n.

Female puparium.—More or less circular; margins flat, narrow at the sides, and wide posteriorly; central portion highly convex; texture smooth and almost wax-like in appearance; colour yellowish white or creamy white, margins paler. Pellicles tilted forward; those of the larvæ marginal and straw-coloured; the second pellicles are similar in colour but have two dark brown or blackish, triangular areas on the abdominal segments; ventral scale absent. Diameter 1–1.15 mm.

Female, adult.—Broadly pyriform; abdominal segments suddenly attenuated. Rudimentary antennæ with two curved spines, but these are often broken away.

Parastigmatic glands generally absent, but a single one is sometimes present at the anterior stigmata. Margin of cephalo-thoracic region with a few widely separated, and minute spines. Pygidium with five widely separated groups of circumgenital glands; formula:—

8	11	8
17 - 16	19 - 19	19 - 18
14 - 13	16 - 15	15 - 15

The last three abdominal segments with extensive groups of large dorsal pores; and there are three or four much smaller ones on each of the two succeeding segments, near the margin; fringe of pygidium (fig. 2) with three pairs of lobes; the median pair recessed and smallest; second and third pairs duplex, margins straight; there is a large projecting pore between the first and



Fig. 2.—*Diaspis regularis*, Newst.; margin of pygidium of adult female.

second and the second and third pairs of lobes, and two beyond them, these projections are distinctly lobe-like, so much so that they may be easily mistaken for true lobes. There is a large simple squama just in advance of the third duplex lobe and two beyond the last projecting pore; those on the free abdominal segments are much the largest.

Male puparium.—Strongly tricarinate, texture close, thin and semi-transparent; colour white, pearly white or greyish white; pellicle pale ochreous or colourless. Length, .75-1 mm.

Mubendi, Entebbe, Uganda, 10. VIII. 1909 (*C. C. Gowley*). Food-plant not stated.

The puparia of both the males and females are all arranged with the greatest regularity and all pointing in the same direction upon the leaf. This is not a unique habit with the DIASPINAE, but I do not remember having hitherto seen this character attained to such a marked degree in both sexes.

The boss-like puparia of the females are very distinctive; and the fringe of the pygidium is also strikingly characteristic.

Diaspis cacti, Comstock.

On Prickly Pear (*Opuntia sp.*); Marg, Egypt, "Autumn, 1909" (*F. C. Willcocks*).

This insect has not hitherto been recorded from Africa, though the very closely related *Diaspis calyptroides*, Costa, has been found there.

***Mytilaspis citricola*, Packard (= *M. beckii*, Newm.).**

On Citrus; Entebbe, Uganda, 3. II. 1910 (*C. C. Gowdey*).

***Chionaspis longispina*, sp. n.**

Female puparium.—Varying from broadly ovate to elongate, and usually broadest immediately behind the exuviae or pellicles. The general colour of the scale is pale translucent grey; but many examples are bright ochreous brown, and there are also colour varieties intervening between these two; the puparia are, however, so completely concealed beneath the superficial layer of the bark of the food-plant that the true character of the secretion is rendered almost invisible. Pellicles dull yellow or orange yellow. Length, 1-1.25 mm.

Female, adult.—Form broadly ovate, the cephalo-thoracic region being as wide as the free abdominal segments. Rudimentary antennae with a single strongly curved and deeply forked spine. There are, apparently, no parastigmatic glands. Pygidium (fig. 3), strongly produced and furnished with two pairs of lobes; the median pair large, and, in well preserved specimens, tridentate on the anterior

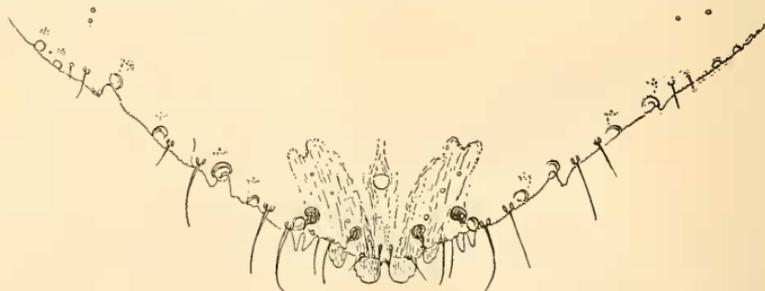


Fig. 3.—*Chionaspis longispina*, Newst.; margin of pygidium of adult female.

lateral margin, the dentations being broadly rounded; second pair of lobes small and dentate on the outer lateral margin only. Squamae more or less rudimentary. Spines very long and slender, with the exception of the median pair which are minute and do not reach as far as the tips of the lobes. Body-wall with one bilateral pair of incisions, each surrounded by a circular patch of dark chitin. Circumgenital glands three to four in number, arranged in a single curved row. Anal orifice towards the margin of the pygidium. Sexual orifice almost centrally placed.

On *Justicia alba*; Ghezireh, Egypt, 2. IX. 1910 (*F. C. Willcocks*).

The distinguishing characters of the female are the long slender spines on the pygidium; the curious form of the antennal spines; and the absence of grouped circumgenital glands.

The "mining" habits of the female are rather striking, though many species insinuate themselves beneath the living cuticle of their food-plants, so much so in *Chionaspis biclavata*, Comstock, as to render the puparium quite invisible.

Scattered among the females were a number of male puparia which from their general form and colour are, I believe, referable to the genus *Parlatoria*, and

are in all probability those of *P. blanchardi*, Targ-Tozz. These are pale buff or ochreous in colour, short and stumpy in form, and the pellicles are smoky green or bottle-green in colour. They do not, in any measure, agree with the male puparia of any known species of *Chionaspis* with which I am familiar.

***Chionaspis cassiae*, sp. n.**

Female puparium.—White, very highly convex and distinctly mytiliform; generally with distinct transverse layers of the dusky, yellowish brown, epithelial cells and long hairs from the food-plant incorporated with the secretion. Larval pellicles pale orange-yellow; second pellicles paler, and generally completely covered by secretion. Length, 2-2.50 mm.

Female, adult.—Apparently ovoviviparous, as several fully developed larvae were found in the body of the parent. Shape, normal. Rudimentary antennae with two rather long slender spines placed closely together so that they often appear as a single stout spine. Parastigmatic spines 5-7 in number, forming a small compound group near the orifice of the stigmata. Dorsal pores extending as far as the thoracic region; these organs are arranged, as usual, in scattered and somewhat indefinite bands broadening towards the margins of each segment, with the exception of the last in which they are placed much more closely together, forming definite narrow bands, widely separated in the median line. Pygidium with a similar band of pores, and five groups of circumgenital glands, the formula of which is as follows:—

8	11	6	9
21 - 19	26	17	20
28 - 27	32	20	? 21
		-	27
			20 - 22
			24 - 27

median lobes (fig. 4) distinctly bilobed and apposed basally. Squamae spinose and

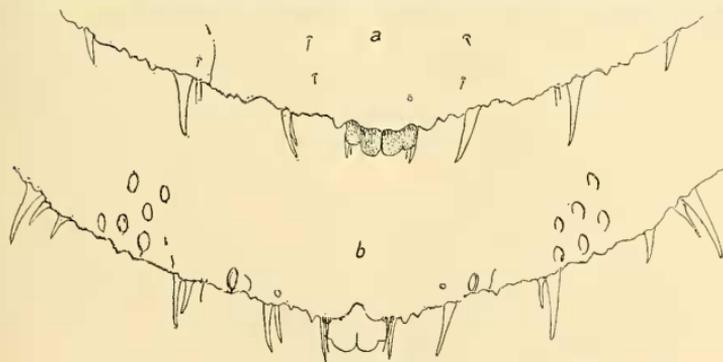


Fig. 4.—*Chionaspis cassiae*, Newst.; margin of pygidium of adult female; a, dorsal view; b, ventral view.

arranged in five bilateral pairs; the first pair covering the lateral margins of the median lobes, being much the smallest.

Puparium of male.—Pure opaque white; with widely separated transverse ridges or carinae, each ridge being curved towards the distal extremity of the puparium. Pellicles bright yellow. Length, 1-1.50 mm.

On *Cassia floribunda*; Entebbe, Uganda Protectorate, 1. VIII. 1910 (*C. C. Gowdey*).

The carions form of the male puparium should at once serve to distinguish this insect from any other member of the genus *Chionaspis*, typical forms being more or less distinctly tricarinate. In this species, however, there is no trace of the usual longitudinal ridges, which is remarkable, seeing that hitherto little variety has been found in the form of the male puparia.

The female belongs to that section of the genus in which the median lobes are in close apposition; it does not possess any very striking morphological characters but is apparently distinct.

***Chionaspis substriata*, Newstead.**

On Palm; Entebbe, Uganda, 18. VI. 1909 (*C. C. Gowdey*).

***Chionaspis dentilobis*, Newstead.**

Uganda (*C. C. Gowdey*). Food-plant not stated.

***Fiorinia africana*, sp. n.**

Female puparium.—Somewhat ovate but suddenly narrowed posteriorly; widest and very highly convex in the region just behind the larval pellicle. Colour varying from pure white to smoky grey; the secretory matter is pure white, but when the layer over the exuviae of the second stage female (second pellicle) is thin, the dark colour of the underlying insect shows through, giving the puparium a smoky grey tinge. Over-crowded examples of the puparia become distorted and irregular in shape as in other *DIASPIINAE* under similar conditions. Larval pellicle usually ochreous buff, often with a small bottle-green spot at the caudal extremity. Second pellicle piceous or dark castaneous sometimes with a dull crimson area in the centre, the colour is, however, very variable.

Female, adult.—Pygidium (fig. 5) with an irregular arched group of circum-

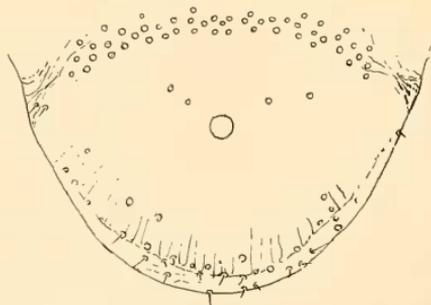


Fig. 5.—*Fiorinia africana*, Newst.; pygidium of adult female.

genital glands near its articulation with the first (distal) free abdominal segment; margin with (? several) simple quadrate lobes, and a number of short spines.

Female, second stage (nymph).—Somewhat pyriform in shape, with the abdominal segments gradually tapering towards the pygidium; each segment

five in all, with a single minute spine. Pygidium (fig. 6) strongly produced. Median lobes strongly bilobed, the outer lobe angular and tooth-like, the inner lobe square at the tip; on either side of the lobes are four large tooth-like projections and at the base of each pair a large secreting pore; there are also four similar marginal pores extending beyond them. Spines minute, one pair on both

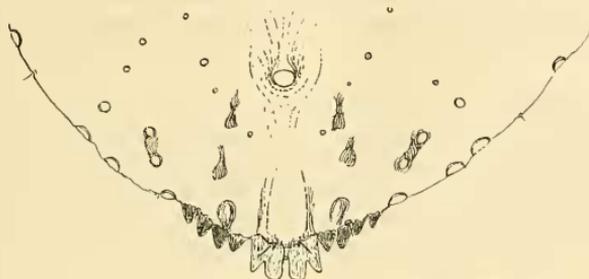


Fig. 6.—*Fiorinia africana*, Newst. ; pygidium of second stage female (nymph).

dorsal and ventral surfaces at the base of the median lobes, and a single one between the third and fourth tooth-like projections. Anal orifice central. There are a few isolated, circular glands, and a single bilateral pair towards the centre of the margin which are united by a spirally striated thickening of the body wall; there are also four similar chitinous patches, but in these the striae are more or less longitudinal. Length, 1.75-2 mm.

Male puparium.—Relatively large, sides more or less parallel, convex for the greater part, but with the posterior extremity flattened. Pellicle usually bottle-green, but a few examples are dull greenish yellow; in some instances they occupy an almost oblique position; in others they are parallel with the secretory portion. Normally they are straight, but in a very large percentage of cases they are curved or contorted owing chiefly to over-crowding or to the nature of the bark upon which they are fixed.

On poplar trees; Garden of the Horticultural Society, Gizeh, Egypt, March, 1910 (*F. C. Willcocks*).

All attempts to separate the adult female from the interior of the nymphal skin (second stage female) having so far failed, it has been impossible to define all of the morphological characters. Judging from what one has been able to see of the pygidium through the integument of the nymph, this insect is clearly distinct from any hitherto described species, and structure of this part in the nymph will at all times serve as a ready means of determining the insect.

Parlatoria (Websteriella) zizyphi, Lucas.

“On orange trees imported from Malta”; Egypt (*F. C. Willcocks*).

This pest of the orange and other species of Citrus, cannot be considered as newly introduced into Egypt, as examples have been previously received from this country. Moreover, it has a very wide distribution, and is found in nearly all the orange-growing countries of the world. It is one of the citrus pests in Malta, and is there generally distributed over the whole Island.

Parlatoria (Websteriella) ? blanchardi, Targ.

On Mis-mish (Apricot); Ghezireh, 2. IX. 1910 (*F. C. Willcocks*).

The examples are not quite typical either in the form of the female puparia or in the character of the fringe of the pygidium. It may be necessary, therefore, at some future date to make it a variety of the above-named species; but it is advisable to examine a longer series of *P. blanchardi*, from various food-plants, before taking this step.

Lecanium (Saissetia) nigrum, Neitner.

On *Ficus* sp.; Uganda Protectorate (*C. C. Gowdey*). No other data given.

The leaves to which these insects were attached were also tenanted by the very interesting Coccid herein described as *Ceroplastodes gowdeyi*, sp. n.

The examples are unusually pale, and the median ridge well defined; but I do not find that they differ morphologically from typical examples of *L. nigrum*.

Lecanium elongatum, Signoret (= *L. longulum*, Douglas).

On *Albizzia* sp. ?; Entebbe, Uganda, 6. X. 1910 (*C. C. Gowdey*).

Lecanium tenuivalvatum, sp. n.

Female, adult.—Narrowly elliptical and slightly produced in front; highly convex; margin narrowly flattened in front and at the sides, broadly so posteriorly; dorsum smooth and shining; sides distinctly wrinkled. Colour of parasitised examples black, with pale margin: non-parasitised examples pale ochreous buff. Antennae short (fig 7, *a, b*) of 6 or 7 segments. Legs short;

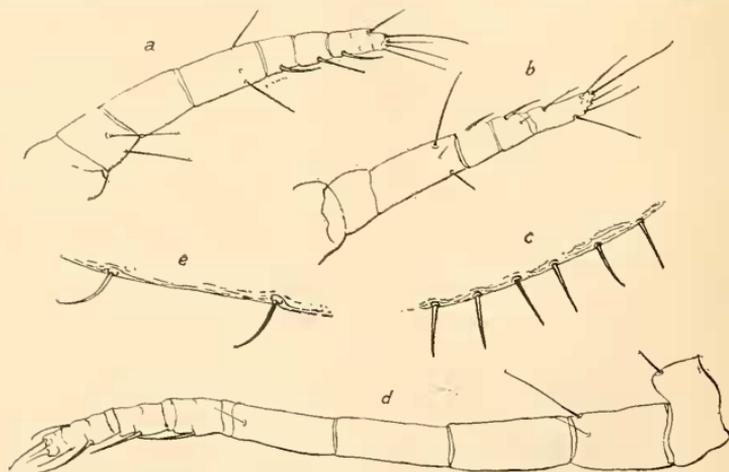


Fig 7.—*Lecanium tenuivalvatum*, Newst. ; *a b*, antennae ; *c*, marginal spines.
Lecanium elongatum, Sign. ; *d*, antenna ; *e*, marginal spines.

anterior pair scarcely longer than the antennæ. Anal lobes attenuated; apices with several stout spines; and there is a single and very long slender spine, arising from the ventral surface, the tip of which projects beyond the apex of the lobe. Stigmatic clefts shallow; spines rather short and bluntly pointed, central one a little more than twice the length of the two laterals. Marginal spines (fig. 7, *c*) long; they are also set closely together and are less deciduous on the cephalic margin than elsewhere. Derm cells minute, simple, and very widely separated. There are a few minute spines just in advance of the anal lobes. Length, 1.75-2.50 mm.

On Citronella grass; Entebbe, Uganda, 25. II. 1910 (*C. C. Gowdey*).

The insects were so numerous that they almost covered the leaves of the food-plant; and although so abundant quite 98 per cent. of them had been destroyed by a Chalcidid parasite; it is highly probable, therefore, that the markedly convex nature of the body was caused by the parasites, so that too much importance cannot be attached to this character.

This Coccid somewhat resembles a miniature example of *Lecanium elongatum*, Signoret, but is clearly distinct; apart from its small size it may be easily distinguished by the character of the antennæ, and the closely set marginal spines.

I am extremely indebted to Mr. E. E. Green for giving me the opportunity of describing this insect; I have pleasure also in adopting the MS. name which he has given to it. Figures of the antenna and marginal spines of *Lecanium elongatum*, Signoret, (fig. 7, *d, e*) have been added for convenience of reference.

Lecanium (Eulecanium) tremæ, Newstead.

On "Nsambyia"; Palissa, Uganda, 1. XII. 1910 (*C. C. Gowdey*).

This species was described, quite recently, from examples collected by Prof. A. Zimmermann, at Amani, German East Africa. The females bear a strong superficial resemblance to *Lecanium persicæ*, but may be readily distinguished by the very distinct and strongly rounded ridge to the margin, as well as by other important morphological characters.

Pulvinaria jacksoni, Newstead.

On Cotton; Kyerime, near Lake Salisbury, Uganda, 10. XII. 1910 (*C. C. Gowdey*).

This remarkable Coccid has hitherto been recorded* only from the West Coast of Africa, where it was found infesting Cacao and a species of *Ficus*. In my original description of the insect, I called attention to the presence of two large flaccid tubercles in the stigmatic clefts as being one of the marked specific characters. In the examples from the Uganda Protectorate these processes are not visible, but I believe, however, that they have been completely destroyed by excessive maceration in the caustic potash. However this may be, the great length of the ovisac and its curious fungoid appearance will serve at once to distinguish this from any other known species of the genus.

* Journ. Econ. Biol. 1908, Vol. II, No. 4, p. 155.

***Pulvinaria psidii*, Maskell.**

On *Alternanthera versicolor*, Entebbe, Uganda, 1. VIII. 1910 (*C. C. Gowdey*); and on Coffee, Mabira Forest, Uganda, 15. IX. 1910 (*C. C. Gowdey*).

Judging by the number of females present upon the leaves submitted, this insect must cause serious injury to the coffee plant.

***Ceroplastes ugandæ*, sp. n.**

Test of old adult female.—Hemispherical, surface uneven and coarsely wrinkled, due evidently to shrinkage; not divided into "plates;" lateral margin on each side with a short and very broad arm-like extension which slightly overlaps the branch, if a slender one, to which the insect is attached; posterior portion may be broadly bilobed and slightly recurved. Colour dull crimson with irregular greyish ochreous areas, the latter being probably due to abrasions of the surface. In the comparatively fresh examples, the wax yields to pressure and contains a large percentage of moisture. In the very old examples, the test becomes brittle and cellular. Length, 13-14; width, 11-12; height, 11-12 mm.

Female, adult.—Hemispherical, dorsum obconical, with a very distinct tubercle, the apex of which is furnished with a minute sharp ridge; there is a similar ridge-like tubercle on either side of the rudimentary caudal process, and one also over each of the posterior stigmatic clefts. Cephalic lobe, strongly produced in the young adult female, much less so in old examples. Derm uniformly and strongly chitinised; piceous; surface almost covered with rather widely separated papillæ;* by transmitted light these papillæ appear as small ovate glands (fig. 8, *b*) in examples which have been macerated in potash. Stigmatic clefts (fig. 8, *a*) rather shallow, and immediately above them is a large broadly ovate

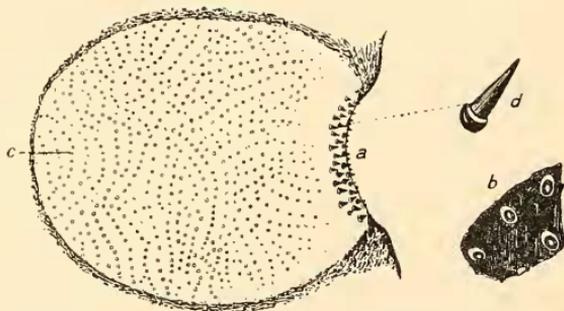


Fig. 8.—*Ceroplastes ugandæ*, Newst; *a*, stigmatic cleft; *b*, dorsal pores; *c*, parastigmatic glands; *d*, spine of the stigmatic cleft.

group of circular pores (fig. 8, *c*). Spines (fig. 8, *d*) short, simple and not confined to the margin. Diameter, 7-8; height, 6-7 mm.

On "Amakebe," Uganda (*C. C. Gowdey*).

* These are absent in a parasitised female, and the derm is thin and much more highly polished.—R. N.

The paper wrappers in which the specimens were packed were all stained dull crimson from contact with the waxy tests of these insects. *Ceroplastes quadrilineatus*, Newst., also produces a similar dye when crushed; but although the tests of these two species are almost identical in colour, there is no trace of the four white lines in *C. ugandæ*. Moreover, the female of the latter may be easily determined by the papillate character of the derm, and the distinct central and lateral tubercles.

Ceroplastes galeatus, sp. n.

Test of adult female.—Wax hard; creamy white or dusky yellowish white; roughly hemispherical; divided into distinct plates; dorsum with a central dark nuclear spot situate in a deep depression, the latter extending as a narrow groove as far as the region of the anal lobes; lateral plates separated by dark depressed lines; lateral margins over the stigmatic clefts projecting considerably beyond the hemispherical portion, in the form of two peak-like extensions, on both surfaces of which are the opaque white stigmatic bands; area surrounding the anal orifice almost denuded, so that the colour of the insect is visible. Width, 4.50–5; length, 4–4.50 mm.

Female, adult.—Hemispherical; shining and uniformly castaneous; cephalic lobe strongly defined; stigmatic clefts well marked. Antennæ (fig. 9, *a*) of six segments of which the third is much the longest; formula, 3, (2, 6), 1, (4, 5).

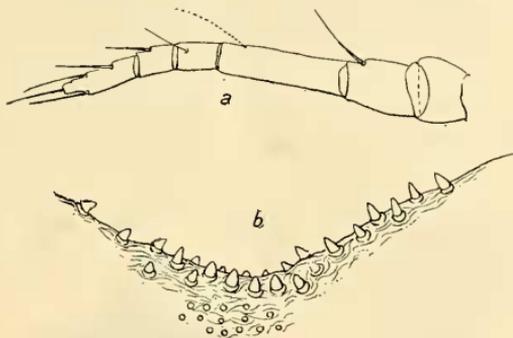


Fig. 9.—*Ceroplastes galeatus*, Newst.; *a*, antenna; *b*, stigmatic cleft, with spines.

Legs normal. Stigmatic spines (fig. 9, *b*) rather small, narrowly conical, and more or less uniform; they vary from 25–38 in number. Marginal spines simple, and rather short. Derm cells ovate, rather large and widely separated, though most numerous just within the margin. Anal lobes minute. Caudal process obsolete.

Food-plant not stated. Entebbe, Uganda, 10. VIII. 1910 (*C. C. Gowdey*).

This insect belongs to that section of the genus *Ceroplastes* of which *C. floridensis*, Comst., may be taken as a type. The distinguishing feature of the test is the lateral extension of the wax, which is seen best when the insect

is removed from the branch; it then bears a very striking resemblance to a helmet in miniature; whether this character is a constant one remains to be seen, but as it is present in all of the examples before me, I feel that it cannot be due altogether to exigency of location upon the slender twigs. There are no dentate spines in the stigmatic clefts as in *C. floridensis* and the integument is uniformly chitinous in the old examples.

Ceroplastes vinsonioides, sp. n.

Test of old adult female.—Dusky crimson, or brownish with a faint tinge of dusky crimson; anterior margin sometimes paler (possibly pale crimson or pink when fresh); form rather broader than long; flattish above, with a central nucleus; sides slightly recurved and projecting, and radiating from them are four short, thick, elevated arms, the anterior pair sometimes deeply concave dorsally, and all of them may be tipped with white wax.

Test of young adult female.—Similar in colour to that of the older examples; flat, with central area slightly raised and nucleated; sides with four large and two small arms, the posterior pair shortest and tipped with greyish wax. Ventral surface (fig. 10, *a*) with a rather broad and conspicuously white line of secretion (wax) extending from each of the four stigmatic clefts to the tips of the radiating arms; the anterior half of the short posterior arms are also formed of pure white wax, but this rarely extends to the dorsal surface. Length of old examples, 4–5 mm.; width, 5–6 mm.; height, 1–1.50 mm.

Female, adult.—Cephalic region without a lobe-like extension; caudal process rudimentary; stigmatic clefts (fig. 10, *b*) sharply defined but not very deep; spines large, conical, and somewhat irregular in size, arranged three deep in the centre, suddenly merging into a double row and finally into a single one on either side; externally to these is a very large isolated and bluntly bidentate spine (fig. 10, *c*) separated from the group by a little more than its own length;

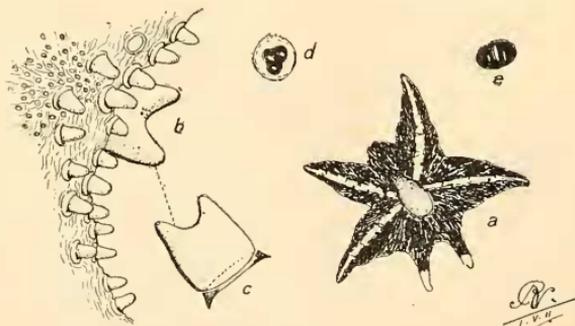


Fig. 10.—*Ceroplastes vinsonioides*, Newst.; *a*, young adult female, ventral view; *b*, stigmatic cleft, with spines; *c*, bidentate spine; *d*, *e*, glands.

parastigmatic glands numerous, forming a compact group just within the spines. Antennæ of 6–7 segments. Legs rather long; digitules very long, upper pair strongly dilated; claw minute. Mentum with several long slender spines. Apex

of anal lobes with three (possibly more) spines one of which (the most distal) is of great length; near the base of the lobes are several large spinnerets. Derm with innumerable spinnerets, those on the dorsum forming an indistinct elliptic zone; some of these (fig. 10, *d, e*) have two, others three orifices. Length, 2.25-2.75 mm.; width, 1.50-2 mm.

On Coffee; Namukekera, Entebbe, Uganda, 14. VIII. 1909 (*C. C. Gowdey*).

There were several adult females from this locality; and Mr. E. E. Green, to whom they were sent in the first instance, has retained part of the series. A single adult female was also found upon *Baikea emini*, at Entebbe, 6. X. 1910 (*C. C. Gowdey*), but this individual was associated with, and completely surrounded by, a colony of the young forms and male puparia of a typical species of *Ceroplastes*.

The first examples submitted for examination were recorded in this Bulletin (Vol. I, p. 67). The star-shaped tests of the young adult females so closely resemble those of *Vinsonia* that I had at one time thought the insect referable to this genus; but having examined a longer series of specimens, including some old adults, I have come to the conclusion that it should be placed in *Ceroplastes*, for the following reasons:—(1) the test is formed of soft and easily soluble wax; (2) the ray-like extensions are not retained intact in the later stages; (3) the adult female is morphologically congeneric with *Ceroplastes*.

***Ceroplastes africanus*, Green.**

On *Acacia* sp.; Khartoum, Anglo-Egyptian Sudan, 22. VI. 1910 (*H. H. King*).

This large species seems to be fairly common in Egypt, judging by the number of examples which have been submitted to me from time to time.

***Ceroplastes rusci* (Linn.).**

On *Crataegus* sp.; Gizel, Cairo, 31. VIII. 1910 (*F. C. Willcocks*).

The food-plant is new; but although this Coccid has been found upon several different kinds of plants, it occurs most abundantly on the cultivated fig, to which it is a very serious pest in parts of the Mediterranean area.

***Ceroplastes quadrilineatus*, Newstead.**

One female only, on *Anona muricata*; Masaka, Uganda, 10. IV. 1909 (*C. C. Gowdey*).

***Ceroplastes* ? sp.**

On Coffee; Uganda (*C. C. Gowdey*).

These are chiefly male puparia, with a few immature females. Not referable, I think, to *Ceroplastes vinsonioides*, as they are quite typical in form, and have too many lateral processes of white wax to agree in any measure with this species.

***Ceroplastes* ? sp.**

On *Markhamia platycalyx*; Ndége, Uganda, 28. IV. 1910 (*C. C. Gowdey*).

As the waxy coverings of the specimens are all damaged and the female immature, it is impossible to determine the species.

Ceroplastes sp.

Male puparia only; possibly those of *C. quadrilineatus*, but as there were no females associated with them it is impossible to be definite on this point.

On *Anona muricata*; Masaka, Uganda, 10. IV. 1909 (*C. C. Gowdey*).

Ceroplastes sp.

Male puparia only.

Entebbe, Uganda, 3. III. 1910 (*C. C. Gowdey*).

Ceroplastes sp.

Male puparia only.

On Bark-cloth tree (*Ficus*); Bukoba, German East Africa, 4. IV. 1910 (*C. C. Gowdey*).

Inglisia conchiformis, Newstead.

On *Psidium guajava*; Entebbe, Uganda (*C. C. Gowdey*).

Ceroplastodes gowdeyi, sp. n.

Test of Female (fig. 11, a).—Opaque white, glassy; distinctly divided into relatively large, polygonal plates giving the test a coarsely reticulated appearance; form varying from short ovate to elongate ovate; dorsum flat; marginal series of plates sloping downwards; anterior third of ventral surface enclosed with similar plates to those forming the upper surface of the test, but apparently these are not continued beyond the area occupied by the female. The ventral surface of the dorsal plates is covered with densely felted wax. Length, averaging 4.50 mm.

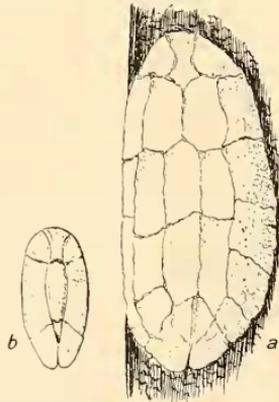


Fig. 11.—*Ceroplastodes gowdeyi*, Newst.; a, test or puparium of adult female; b, puparium of male.

Female, adult.—Lying freely within the test, but after gestation occupying the anterior portion only; the cavity behind the body being filled with empty skins of the ova and a little flocculent wax. Body shrivelled but distinctly Lecanoid in form; front slightly produced,

Female, old adult.—These were so completely enveloped by the hyphæ of a fungus as to render nearly all the structural details invisible. It was possible to ascertain, however, that the antennæ are similar to, or almost identical with, those in the young adult; the large dorsal pores are also present, though it is impossible to say if they are arranged in the same way; the marginal spines are identical; but the digitules of the anterior tarsi (fig. 12, *a*) are more distinctly dilated, and those of the claw are slightly less spatuliform.

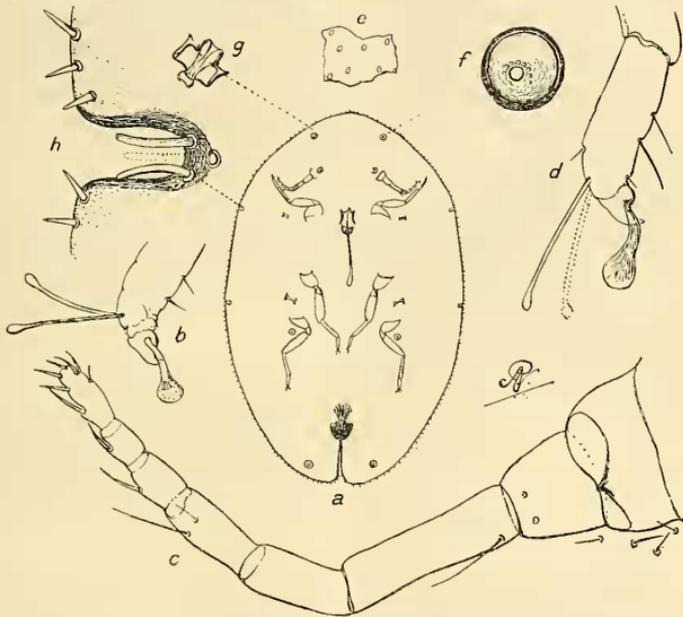


Fig. 12.—*Ceroplastodes gowdeyi*, Newst. ; *a*, young adult female ; *b*, tarsus of old adult female ; *c*, antenna ; *d*, tarsus ; *e*, derm ; *f*, one of the paired circular glands, ventral aspect ; *g*, the same in profile ; *h*, stigmatic cleft.

Female, young adult (fig. 12, *b*).—Ovoid. Anal cleft well defined; lobes longer than broad; setiferous ring with ten hairs. Antennæ (fig. 12, *c*) of eight segments; the sixth and seventh each with a single slender spine, the eighth with 4-5; there is a very long hair arising from near the base of the third and another from near the apex of the fifth. Legs well developed; unguis (fig. 12, *d*) very short and suddenly pointed; digitules broadly spatuliform; tarsal digitules very long and stout, but the apex is only slightly dilated. Stigmatic clefts (fig. 12, *h*) very deep and narrow; the two lateral spines long, stout and bluntly pointed; marginal spines short, simple. Derm (fig. 12, *e*) with small ovate pores, widely separated and faintly indicated. There are four pairs of circular glands (fig. 12, *f*, *g*), the first placed near the anterior margin; the second near the base of the antennæ; the third near the insertion of the second pair of legs; the fourth near the posterior margin, one on either side of the anal cleft.

Male puparium (fig. 11, *b*).—White, semiopaque and glassy. Form not differing materially from that of the genus *Lecanium*.

On African Bark-tree (*Ficus* sp.); Uganda Protectorate (*C. C. Gowdey*).

The examples were associated with *Lecanium nigrum*, Neitner, and being for the most part badly damaged or covered with "soot fungus" were mistaken, in the first instance, for the puparia of the *Lecanium*.

This very interesting insect is clearly distinct, and is, I think, rightly placed in *Ceroplastodes*: though the presence of large paired glands have not hitherto been observed in that genus. I have much pleasure in dedicating the species to Mr. C. C. Gowdey, who has done much to advance our knowledge of the Coccid fauna of Uganda during the last two years; and we sincerely trust that his researches in future may be rewarded by the discovery of many interesting forms of these and other insects.

Dactylopius longispinus, Targ.

On vine; Mehelleh-Moussa, Egypt, August, 1910 (*F. C. Willcocks*); found also on the "foliage of Mango trees imported from Ceylon," Horticultural Society's Garden, Gizeh, Egypt, 30. VIII. 1910 (*F. C. Willcocks*).

This common mealy bug is practically cosmopolitan, and attacks a large number of plants belonging to various Orders.

Tachardia decorella, Maskell.

On *Anona muricata*; Masaka, Uganda, 10. IV. 1909 (*C. C. Gowdey*).

This lac-producing Coccid is new to the African fauna, having been hitherto recorded only from Australia, India and China. Cockerell has described two species from Natal, *T. actinella* and *T. albida*, so that there are now three African representatives of the genus. The amount of lac secreted by *T. decorella* is not sufficient to be of any value from a commercial point of view.

Icerya longisetosa, Newstead.

On the branches of an undetermined shrub, near the north-western shore of Lake Nyasa, 30 miles south of Karonga, 4. VII. 1910 (*S. A. Neave*).

This insect was recently described from material collected by Prof. Vosseler, at Amani, German East Africa, on *Acacia* sp.

Aspidoproctus maximus, Sanders.

On an undetermined tree, at Fort Jameson, North Eastern Rhodesia, June, 1910 (*S. A. Neave*).

This is the so-called "Goliath Coccid," and is certainly the giant of its race, well-matured examples measuring as much as 33 mm. in length. It was discovered by Dr. Fulleborn in 1907 at Langenburg, German East Africa, and during recent years has become a pest in Rhodesia.

Lecaniodiaspis africana, sp. n.

Antonina (?) *africana*, Newstead (*sine descr.*), Quart. Journ. Liverpool Univ. I, 2, pp. 69, 72 (1906); Draper, Scale-Insects of Egypt, p. 11 (1907).

This insect may at least be considered as one of the minor pests of Egypt. All the material which has hitherto passed through my hands were immature females without ovisacs. In my private report to the Director of the Institute

of Tropical Research, Liverpool University, I referred the species doubtfully to the genus *Antonina*, and, at the time, gave it the provisional specific name *africana*. A copy of my report was also forwarded to Mr. Draper, the Delta Barrage Gardens, Cairo. Unfortunately the specific name was published (*sine descr.*) by the respective authorities inadvertently, and until now I have been unable to deal with the matter as the original material together with a number of other Egyptian Coccids was accidentally destroyed. Now, thanks to Mr. Willcocks, who has sent me a number of females in various stages, I have been able to make more extended observations and furnish details regarding the structural characters of the insect.

Female ovisac.—Very closely felted and almost wax-like in appearance. Cream-buff or straw-coloured, becoming greyer after long exposure. Form short ovate and very highly convex; posterior half with a faint trace of a short median ridge, but this is, in old examples, more or less broken up into a series of faint tubercular projections; on either side of the central ridge are a number of transverse ridges, varying in intensity according to the age of the individual, but in all cases they are interrupted centrally, and in old examples they are often represented merely by minute tubercular projections. Average length, 5 mm.; width, 3.50 mm.

Female, adult.—Very short ovate or sub-circular in outline, after maceration in potash. Antennæ (fig. 13, *a*) of seven or eight segments; sixth with one, eighth

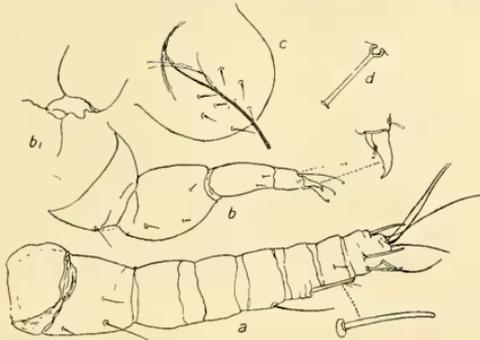


Fig. 13.—*Lecaniodiaspis africana*, Newst.; *a*, antenna of female; *b*, leg of female; *b*₁, curious form of the trochanter, as seen in some individuals; *c*, meutum; *d*, spinneret.

with three rather straight and obtusely pointed spines; there is a slight variation in the relative length of the individual segments and also asymmetry. Legs (fig. 13, *b*) present but atrophied, length less than that of the antennæ; claws with a distinct ventral tooth. The whole of the dorsal surface of the derm is thickly and evenly studded with 8-shaped glands, all of uniform size and structure, but they are generally tilted so that the double orifice, which gives them the characteristic 8-shaped appearance, is rendered invisible. Anal segment with a rather shallow cleft which is closed ventrally, as in other members of the genus, with a large bilobed plate, each lobe being approximately triangular in outline, bearing a short stout spine at the apex and two or more near the base.

Anal ring with ten long stout hairs. There are 3-5 short spines of varying lengths at the margins of the anal cleft; but there are none at the margins of the body; there is, moreover, no trace of any stigmatic clefts or of the spines which usually accompany these structures. Derm, immediately opposite the base of the anal bilobed plate, with several spinose hairs, some of which are very long or equal in length to the longest axis of the plate. There are usually five eribriform circular plates arranged in two longitudinal and slightly divergent series. Length, 3.50-4 mm.

Female, young adult.—Dusky red-brown, brown or smoky brown, generally protected by a thin coating of grey or ochreous and somewhat granular secretion. Rather elongate and shaped somewhat like a *Lecanium*; dorsum with a very pronounced keel, at the base of which is a regular series of short transverse ridges, interrupted in the centre by a deep longitudinal groove. What the insect is like in life it is not possible to say; but it is quite evident that the transverse ridges which are so clearly indicated in the dried examples correspond with those found in the tests or ovisacs of the old adult females.

Male puparium.—Ochreous buff or pale straw-coloured, rarely creamy white; form normal; transverse segmentation or ridges generally distinct. Length, 1.50-2 mm.

On *Acacia arabica*; Ezbet el Nakhl, Egypt, November, 1909 (*F. C. Willcocks*); and on the same kind of tree in Upper Egypt, above Aswan, July, 1909 (*F. Hughes*); also on *Ficus* sp., near Cairo, summer, 1909 (*F. C. Willcocks*).

Lecaniodiaspis mimosae (Maskell) is, as far as I can gather, the only other African representative of the genus. This species was considered by Maskell* as only a variety of his *L. prospodidis*. Cockerell,† however, raised *mimosae* to specific rank, though he has not, to the best of my knowledge, stated his reasons for doing so. Recently I had thought that *L. africana* might be specifically identical with Maskell's *mimosae*; but Maskell (*loc. cit.*) distinctly states that the "feet" are absent in his *L. prospodidis*, and that as far as he could see "there is nothing but size and colour" to distinguish his var. *mimosae* from it. I have come to the conclusion, therefore, that as *L. africana* possesses relatively well developed legs it cannot be referable to either of Maskell's species.

Tachardia longisetosa, sp. n.

Test of adult female.—Smoky ochreous buff to dusky amber-yellow. Isolated examples are distinctly hemispherical in form, with strong and somewhat wavy ridges radiating from the dorsum. Central orifice distinct and surrounded by a dull crimson area. Diameter, 3-5 mm.

Female, adult.—Ovoid in outline, after maceration in potash. Antennae absent. "Lac tubes" very short and much more transparent than in *T. decorella*, Mask.; sub-central group of pores compact; outside the central compound group are several (17-20) circular pores irregularly scattered over the broader portion of the structure; surface evidently reticulated. Anal spine distinctly funnel-shaped. Anal process prominent; anal ring with ten very long hairs projecting considerably beyond the pointed dorsal process (? modified anal lobes); the latter

* Trans. N. Zealand Inst., 1896, p. 316.

† Check List, Supp. p. 392 (1899).

with distinct serrations at or near the base of the dorsal edge. The individual glands forming the compound marginal groups, circular; central orifice escutcheon-like; periphery with from 2-4 clear, bead-like processes; when two of the latter are present they are arranged on opposite sides; when there are three they form a triangle, and when four in number they are equilaterally placed. Length (average), 4 mm.

On *Ficus* sp. (Bark-cloth tree); Entebbe, Uganda, 16. III. 1911 (*C. C. Gowdey*).

The tests of this species bear a very strong resemblance to those of *T. decorella*, Mask., but they are generally larger and less regular in form. The female differs from the latter in the great length of the hairs of the anal ring; and from *T. actinella*, Cockerell, in the absence of antenna.

A large percentage of the insects are infested with Chalcidids.

Aonidia glandulosa, sp. n.

Aonidia glandulosa, Newstead, Draper (*sine descr.*), Scale-Insects of Egypt, p. 11 (1907).

Female puparium.—Straw-coloured or ochreous buff with faint patches of dull orange-yellow; highly convex, sometimes obconical, with the highest portion towards the anterior margin; margins thin and sometimes rounded; larval pellicle yellow, generally completely hidden; second pellicle invariably covered with secretion. Ventral surface white, with an external zone of pale yellowish white; second pellicle large, bright orange-yellow, nude. Ventral scale white; circular; thick at the margins, thin and semi-transparent centrally. Diameter, 1.25 mm.

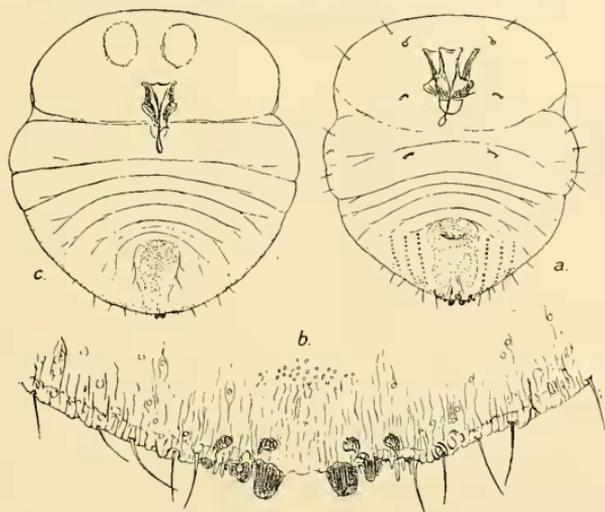


Fig. 14.—*Aonidia glandulosa*, Newst.; a, adult female; b, margin of pygidium; c, nymphal (second stage) female.

Female, adult (fig. 14, a).—With the cephalic segment strongly defined and distinctly articulated, anterior margin very broadly rounded. Rudimentary antennae with a simple spine. Parastigmatic glands 5-6 in number, large; just

in advance of these are two slender hairs; there is a similar hair near the antennæ and usually four marginal ones. Thoracic segments with several (4-6) slender spinose hairs. Pygidium very broadly rounded the central area of the dorsal surface with innumerable clear granular spaces (? glands) rendering the integument strikingly characteristic; dorsal pores in three well-defined series; margin (fig. 14, *b*) distinctly crenulated and thickened; median lobes widely separated and divergent; second pair small; third rudimentary; there are 2-3 rudimentary squames between the second and third lobes and 5-6 long slender spines beyond them. Vaginal orifice near the base of the pygidium. Anal orifice just within the margin; this organ is partly closed by a pair of valve-like processes.

Female, nymph (fig. 14, *c*).—Integument strongly chitinised. Cephalic segment much more constricted than in the adult insect, the articulation is also much more pronounced, and just within the anterior margin is a pair of large clear ovoid spaces (? glandular) which stand out in marked contrast with the surrounding tissues. Pygidium similar to that of the adult, but the median lobes are close together, the margin is more strongly crenulated, and the clear "granular" spaces on the dorsal area are less conspicuous owing to the opacity of the integument.

On "Sunt" tree (*Acacia arabica*); Upper Egypt, above Aswan, July, 1909 (*F. Hughes*). The specimens recorded by Mr. Draper (*loc. cit.*) were also found on *Acacia arabica*, in Egypt.

As the nymphal females are much more easily prepared for microscopical examination than the adults, the pair of large cephalic (?) glands will serve at once to distinguish this insect from its allies; and both stages may be recognised by the curious appearance of the pygidium.

Sphærococcus marlatti (Cockerell).

Phœnicoccus marlatti, Cockerell, Pr. Ac. N. Sci. Ph., p. 262 (1899).

Sphærococcus draperi, Newstead, Quart Jour. Liverpool Univ. I., 2, p. 70 (1906); Draper, Scale-Insects of Egypt, p. 12 (1907).

Having re-examined my material, I have come to the conclusion that the insect which I recorded (*loc. cit.*) is specifically identical with Cockerell's *Phœnicoccus marlatti*, and as the latter was described in 1899, the name *draperi* must sink as a synonym. I do not agree with Cockerell, however, that this insect should be separated from *Sphærococcus*, Maskell, simply because the antennæ are "reduced to a mere tubercle." All the characters are really conformable to the genus and as regards the antennæ Maskell* distinctly states that these organs are "sometimes atrophied." I am convinced therefore that *Phœnicoccus*, as a genus, cannot stand. Cockerell's types were found in America on date palms (*Phoenix sp.*) imported from Algeria. Draper (*loc. cit.*) says that these insects locate themselves at the base of the leaf stalks which they completely cover with the white flocculent or felted matter. He states also that "the pest can be destroyed by painting with strong kerosine emulsion which should reach all infested parts" and further that it is very common in Lower Egypt.

* Trans. N. Zealand Inst., V. XXV., p. 237 (1892).